

IN THE CLAIMS

What is claimed is:

1 1. A measuring apparatus, comprising:
2 a light source for producing light beams for at least two optical channels; and
3 said optical channels each including:
4 an interferometer for receiving one said light beam and providing therefrom a reference
5 beam and a measurement beam;
6 a reflective target for receiving and redirecting said measurement beam;
7 a beam splitter for receiving the redirected said measurement beam and providing
8 therefrom a first portion and a second portion;
9 a detector for sensing said first portion and producing a detector signal based thereon;
10 said interferometer further for receiving said second portion of said measurement beam
11 and combining said second portion with said reference beam to form a result beam;
12 and
13 a receiver for sensing said result beam and producing a receiver signal based thereon.

1 2. The measuring apparatus of claim 1, wherein said light source includes a laser diode.

1 3. The measuring apparatus of claim 1, wherein said light source includes a single light
2 producing unit, a splitter and a bender for producing said light beams.

1 4. The measuring apparatus of claim 1, wherein said light source includes a plurality of light
2 producing units, one per each said optical channel.

1 5. The measuring apparatus of claim 1, wherein said interferometers and said beam splitters
2 employ polarization.

1 6. The measuring apparatus of claim 1, wherein said reflective targets are retroreflectors.

1 7. The measuring apparatus of claim 1, wherein said detectors are position sensitive
2 detectors.

1 8. The measuring apparatus of claim 1, wherein said detectors include at least one member of
2 the set consisting of bi-cell photo diode units, quad-cell photo diode units, and photo diode
3 arrays.

1 9. The measuring apparatus of claim 1, wherein said receivers include photo diodes.

1 10. The measuring apparatus of claim 1, further comprising:
2 a processing system for processing said detector signals and said receiver signals into
3 position data suitable for communication to an external system.

1 11. The measuring apparatus of claim 10, wherein:
2 said light source includes a modulator to produce said light beams including a modulation
3 characteristic; and
4 said processing system includes a demodulator and processes at least one of said detector
5 signals and said receiver signals with phase sensitive detection.

1 12. A measuring apparatus, comprising:

2 means for producing light beams for at least two optical channels; and

3 said optical channels each including:

4 interferometer means for receiving one said light beam and providing therefrom a

5 reference beam and a measurement beam;

6 means for receiving and redirecting said measurement beam;

7 splitter means for receiving the redirected said measurement beam and providing

8 therefrom a first portion and a second portion;

9 detector means for sensing said first portion and producing a detector signal based

10 thereon;

11 said interferometer means further for receiving said second portion of said measurement

12 beam and combining said second portion with said reference beam to form a result

13 beam; and

14 receiver means for sensing said result beam and producing a receiver signal based
15 thereon.

1 13. The measuring apparatus of claim 12, wherein:
2 said means for producing light beams includes:
3 means for producing an initial beam;
4 means for splitting said initial beam into a first beam and at least one secondary beam;
5 and
6 bender means for directing said secondary beams in parallel with said first beam, thereby
7 producing said light beams for said at least two optical channels.

1 14. The measuring apparatus of claim 12, wherein:
2 said interferometers include means for polarizing said measurement beams; and
3 said splitter means includes means for separating with polarization, thereby permitting
4 providing said first portions and said second portions of said measurement beams based
5 on respective polarization characteristics.

1 15. The measuring apparatus of claim 12, further comprising:
2 processing means for processing said detector signals and said receiver signals into position
3 data suitable for communication to an external system.

1 16. The measuring apparatus of claim 10, wherein:
2 said means for producing light beams includes modulating to produce said light beams
3 including a modulation characteristic; and
4 said processing means includes demodulating means to permit processing at least one of said
5 detector signals and said receiver signals with phase sensitive detection.

1 17. A method for measuring positional information about a target, the method comprising the
2 steps of:
3 (a) producing light beams for at least two optical channels; and
4 in each said optical channel:

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- 5 (b) receiving a said light beam and providing therefrom a reference beam and a
- 6 measurement beam;
- 7 (c) receiving at and redirecting said measurement beam from the target;
- 8 (d) receiving the redirected said measurement beam and providing therefrom a first
- 9 portion and a second portion;
- 10 (e) producing a detector signal based on said first portion;
- 11 (f) combining said second portion with said reference beam to form a result beam;
- 12 (g) producing a receiver signal based on said result beam; and
- 13 (h) processing said detector signals and said receiver signals into position data suitable
- 14 for communication to an external system.

1 18. The method of claim 17, wherein:

2 said step (b) includes polarizing said measurement beams; and
3 said step (d) includes separating said first portions from said second portions based on
4 polarization.

1 19. The method of claim 18, wherein:

2 said step (a) includes modulating with a frequency said light beams; and
3 said step (h) includes demodulating at least one of said detector signals and said receiver
4 signals based on said frequency.

1 20. The method of claim 19, wherein said step (h) includes processing with phase sensitive
2 detection.

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